

GOVERNMENT COLLEGE BIROHAR (JHAJJAR)

Summary of Lesson Plans of College Faculty for Academic Session 2024-2025

Name of Assistant/Associate Professor: Dr. Seelu Singh

Class & Sem.: R.Sc.II/ear.II/Sem Subject: Fuel Chemistry SEC Paper-II

Months	Topics/Chapters to be Covered
February Jan 2025	Solid Fuels :- Coal - origin, chemical composition, calorific value, classification, characteristics, distribution of Indian coals, storage and transportation, combustion of coal, coal washing and blending, petrographic constituents of coal, carbonization of coal, manufacture and properties of metallurgical coke, recovery of by-products.
March Feb 2025	Liquid Fuels :- Origin and composition of crude oil, crude oil distillation and its products with special reference to gasoline, kerosene and diesel oil, cracking and reforming, coal-tar distillation products shall.
April March 2025	Gaseous Fuels :- Natural gas, coal gas, coke oven and blast furnace gas, manufacture of water gas and producer gas, carburetted water gas, Synthetic fuel, hydrogenation of coal, Fischer-Tropsch synthesis.
May April 2025	Nuclear Fuels :- Introduction nuclear fuels and nuclear reactors, moderators and structural materials, introduction to renewable energy sources. Combustion: Combustion of solid fuels, calculation of volume and weight of air necessary for combustion of fuels, gas analysis.

Seelu Singh
Signature of Asst/Asso. Professor

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Name of Assistant/Associate Professor: D. Seelu Singh

Class & Sem.: B.Sc.II year II Sem Subject: Fundamental Chemistry -II DSC.

Months	Topics/Chapters to be Covered
Jan 2025	
Feb 2025	<u>Non-aqueous solvents</u> - Physical properties of a solvent, type of solvent and their general characteristics, Solvent system concept, reaction in non-aqueous solvent with reference to liquid NH_3 and liquid SO_2, Hard and Soft acids and base concept, application of HSAB principle. <u>Noble Gases</u> - Occurrence and uses, rationalization of inertness of noble gases, clathrate preparation and properties, chemical properties of the noble gases, chemistry of xenon: structure and bonding in xenon fluorides, oxides and oxyfluorides (XeF_2, XeF_4, XeF_6, XeO_3, XeO_4, $XeOF_2$, $XeOF_4$, $XeOF_6$, XeF_2, XeF_4, XeF_6) nature of bonding in noble gas compounds (valence bond treatment and MO treatment for XeF_2 and XeF_4) molecular shapes of noble gas compounds (VSEPR theory) Test - I
March 2025	<u>Thermodynamics</u> - Brief discussion upto first law of thermody. constant volume and pressure, heat capacities at Joule, Mayer, Leule Thomson, coefficient for ideal gases and real gases and inversion, temp. Calculation of work and heat, dW & dH for the expansion of ideal gases and real gases under isothermal and adiabatic condition for reversible and irreversible processes, enthalpy and internal energy change at constant P, V & T Kirchoff's eq. Second law of thermody. definition of entropy, statement of the law, Carnot cycle and efficiency, Carnot theorem, entropy change in ideal gases, entropy as a function of T, P & V, and P & V criteria of spontaneity and equilibrium.
April 2025	<u>Hydrocarbons</u> - Alkanes: Phy. & Chem. properties of alkanes, free radical substitution, halogenation, Concept of relative reactivity v/s selectivity. <u>Alkenes</u>: Str. and isomerism, general methods of preparation, phy. & Chem. properties. Mechanism of E1, E2, E1cB, syn, Saytzeff and Hoffmann elimination, electrophilic addition, Markownikoff rule, syn and anti-addition, addition of H_2, X_2 symmetrical

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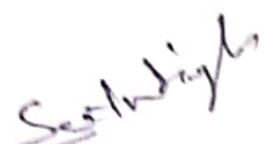
May
2025

hydroboration-oxidation, ozonolysis, hydration

Alkynes: General methods of prepn, uses of alkynes: acidity electrophilic and nucleophilic addition, hydration to form carbonyl comp. alkylation of terminal alkynes.

Aromatic Hydrocarbons and Dienes: Concept of aromaticity, Huckel's rule aromatic chara of arenes, cyclic carbocation and carbanions with suitable examples and heterocyclic compounds with suitable examp. electrophilic aromatic substituted: halogenation nitration Sulphonation, Friedel Crafts alkylation/acylation with their mechanisms, isolated conjugated & cumulated dienes. Sto. of butadiene, chemical rxns 1,2 and 1,4 addition (electro & free radical mechanism) Diels - Alder rxn

Test - II


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